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Surface Wave Tomography of South China Sea from Ambient Seismic Noise and Two-station Measurements

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We have taken the cross-correlation of seismic ambient noise technique as well as the two-station method to analyze the velocity structure in the South China Sea region. The dataset used in this study includes broadband waveforms recorded at the Taiwan BATS (Broadband Array in Taiwan for Seismology), Japan OHP (Ocean Hemisphere Project), Malaysia and Vietnam seismic networks. We remove the instrument response from daily data and filter the waveform with various frequency bands according to the length of each station-pair. Then we apply the commonly used 1-bit normalization to minimize the effect of earthquakes, instrumental irregularities, and non-stationary noise sources near to the stations. With the derived daily cross correlation function (CCF), we are able to examine the timing quality for each station-pair. We then obtain the surface Rayleigh wave dispersion curves from the stacked CCF for each station-pair. To cover the longer period band in the dispersion curves, we adopt the two-station method to compute both the group and phase velocities of surface waves. A new surface wave tomography based on ambient seismic noise study and traditional two-station technique has been achieved in this study. Raypaths that travel through the Central basin present higher velocity, which is in agreement with the idea of thin crust. On the other hand, the slower velocity between Taiwan and Northern Luzon, Philippine is mainly due to a thick accretionary prism above the Manila trench.